U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN No. 60.

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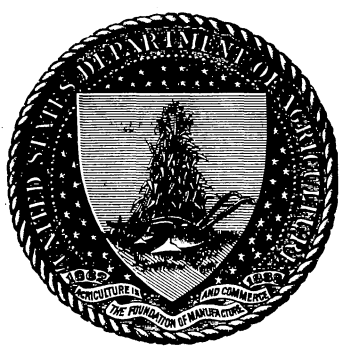
METHODS OF CURING TOBACCO.

[Revised edition.]

BY

MILTON WHITNEY,
Chief of Division of Soils.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1898.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF SOILS,
Washington, D. C., February 19, 1898.

SIR: I have the honor to submit herewith copy for a revised edition of Farmers' Bulletin No. 60, entitled Methods of Curing Tobacco. This bulletin was originally prepared in the fall of 1897 and was of especial interest and profit at that time when tobacco growers were ready to cut, house, and cure their crops. There is still a demand for the bulletin, and the changes made in the revised edition render it suitable for continued distribution. It is the intention to submit for publication information regarding tobacco growing and the marketing of tobacco as soon as the same can be prepared.

Very respectfully,

MILTON WHITNEY,
Chief, Division of Soils.

Hon. JAMES WILSON,
Secretary of Agriculture.

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METHODS OF CURING TOBACCO.

INTRODUCTION.

Tobacco goes through certain processes of fermentation from the time it is cut until it is ready for the manufacturer. During this time it is said to be curing and aging. Very little is known about the chemical changes that occur in these processes. A great deal of work has been done by scientific men in studying them, but beyond the bare fact that they are similar to what goes on in wine and in the ripening of cream and the aging of cheese little has been discovered. It is a very important field of research and deserves a thorough investigation.

Upon the skill with which this curing and aging is managed depends in a large measure the value of the tobacco to the manufacturer. Farmers, as a rule, pay little attention to the matter and lose the profit that might otherwise be theirs. The curing comes usually when farm work in general is not pressing, and it is therefore the more deserving of attention.

Only general principles can be discussed in the present bulletin, for the minor details, however important in the work of handling tobacco, must be mastered by actual experience, under the supervision of an expert. The following suggestions will be found to apply to widely separated localities and to tobaccos intended for very different trades and uses.

CURING THE NORTHERN CIGAR TOBACCO.

Theoretically each tobacco plant in the cigar tobacco districts produces the filler, binder, and wrapper necessary for the manufacture of a cigar. The best leaves are to be used for wrappers, the second quality for binders, while the remaining leaves are for fillers. Practically, however, it takes leaves of very different qualities and properties to make the best filler and the best wrapper. A soil which will produce the best grade of wrapper is not likely to produce a filler of corresponding value. A soil which will produce a filler of fine quality will produce a wrapper leaf which is too heavy, strong, and dark for our present market demands. On account of the difference in the soils different grades of tobacco are produced in the different northern tobacco districts. The main sorts of the Connecticut Valley crop are a wrapper and a binder leaf. This does not mean that good fillers are not raised

on some of the soils of the Connecticut Valley, but the average soils at present used for tobacco produce a good wrapper leaf and a poor filler, as a rule.

On the other hand, the soils of the tobacco district of Ohio are very strong, heavy soils, containing a very high water content. These produce a strong, heavy, dark type of tobacco, which can be used at present only for filler purposes. The characteristic crop of Ohio used to be a wrapper, but in the change of style from dark to light cigars the produce of that district is adapted at present to the filler only. In Pennsylvania the same thing holds true, except that along the river courses the soils are lighter and a very fine quality of wrapper can be produced. The main dependence of the grower is a filler crop, and on the heaviest limestone soils filler leaf only is produced. The Wisconsin soils appear to come midway in texture between the Connecticut Valley and the Pennsylvania soils, and both filler and wrapper are produced.

It is important that the distinction between the commercial requirements of the wrapper and the filler leaf be recognized; for under the present demands it is not only impossible to produce a wrapper and a filler of the same excellence upon the average soil of any of these Northern districts, but the treatment of the plant from the time it is set out until it is in the hands of the manufacturer should be different, depending upon whether the main object is to produce a wrapper or a filler leaf.

The crop is planted in rows, usually 3½ to 4 feet apart, and 18 to 24 inches apart in the row. It is topped to 15 or 18 leaves, and is frequently suckered during the season. It is on the ground about ninety days, the season averaging from about the middle of May to the last of August. All the leaves on a plant do not ripen at the same time. Under the conditions prevailing it is therefore usually considered necessary to determine the average time of ripening and cut the plant when the middle leaves are ripe. The ground leaves will of course be over ripe, while the top leaves will have hardly matured. The stalk is cut and laid on the ground for one and one-half to two hours to wilt. It is turned, if necessary, to prevent burning. It is important that rain should not fall upon the plant while lying on the ground. After it is wilted sufficiently the stalk is speared on a lath, about eight plants to the lath. It is then hung in a barn to dry. The tobacco barn is quite tight but well provided with ventilators, which are opened on favorable days, as the barn must be well ventilated until the tobacco is thoroughly wilted. Artificial heat is not used. The time and rapidity of curing depends entirely upon the weather. It rarely exceeds two months, however.

When thoroughly dried the laths of tobacco are taken down during a warm, damp spell, and piled in heaps with sacks or cloths spread over them to keep the pile in "order" for several days. "Order" or "case" in tobacco curing means a moist condition in which the tissue will not break. Frequently when the piles begin to dry the butts are

sprinkled with water. The stalks are taken from the laths and the leaves stripped off. The leaves are put by handfuls into a box lined with strong, tough paper. The paper is wrapped tightly over it and the bundle securely tied. A large proportion of the tobacco is sold to the dealers in this shape. Some producers sort it, however, and get 3 cents a pound more for it, although the packers usually re-sort it before the fermentation.

When properly sorted the tobacco is graded into fillers, binders, and long and short, bright and dark wrappers. These are made up into "hands," i. e. bundles of leaves tied together at the base. The tobacco is frequently "blown," that is, lightly sprinkled with water to bring it into proper order before casing or packing down, but this is never practiced by the best farmers.

The fermentation, or sweating, is usually managed by the packers and not by the farmers. The sweating is done in wooden cases, strongly put together, holding on an average about 300 pounds of tobacco. These cases are not tight, but have a space of one-half inch between the boards. A good crop in sweating loses from 10 to 14 per cent of its weight, and there must be sufficient ventilation to allow this moisture to escape. On the bottom of the box is put a layer of top leaves, or seconds, as the outside does not sweat readily. The leaves are well shaken out and packed with the butts outside, and tightly pressed down to exclude the air as much as possible. The tobacco is piled into the box and pressed down with a moderate pressure, and then the top of the box is screwed on. The cases are then marked and piled up in the warehouse, in rows 3 or 4 boxes high, for the sweat. Once, at least, during the season good packers turn the boxes upside down and put the top boxes at the bottom.

The tobacco is cased in the fall or winter, and so remains through the next summer. The temperature of the warehouse is quite even during the winter. After the summer's sweat the operation is finished, and the cases are opened and sampled. This is one year after the harvest. After sampling the tobacco is returned to the case without breaking the bulk, and remains in the case until it is wanted by the cigar manufacturer.

The whole process of fermentation in this operation is largely a matter of chance. It is not controlled, the temperature is not taken to note the progress of the fermentation, and nothing is done, in point of fact, except to maintain the temperature of the room moderately uniform during the winter season. In some cases the fermentation is overdone and in other cases it is underdone. There is a strong feeling among the more intelligent planters that more information is needed upon the changes which take place, in order that these may be carefully controlled.

There is room for marked improvement in grading and sorting the tobacco and putting it upon the market. Comparatively little attention is given to this subject, and as a consequence the cases when opened

show various-sized leaves of various colors and shades. A profitable lesson can be learned from the methods of the Cuban and Sumatra growers. With them the tobacco is graded very strictly according to the length of leaf and the color and shade. The small manufacturer in buying a few bales is able to maintain a uniform brand of cigars. He is not able to do this with a small stock of domestic leaf, on account of the great variation in the color of the leaves.

CURING TOBACCO IN FLORIDA.

There are two important tobacco areas in Florida—the old area, in the northwestern part of the State, on the Lafayette clays, and the new area, in the center of the peninsula, around Ocala, Bartow, Fort Meade, and adjacent towns. The soil is quite different, but the tobacco is treated in essentially the same way in both localities. Both Cuban and Sumatra tobaccos are grown in the northern and western parts of the State, while mainly Cuban tobacco is grown in the peninsula.

The Sumatra tobacco is planted in rows 4 feet apart and 12 inches apart in the row. It is not topped until quite late and the field well in bloom, and from 24 to 26 leaves are left on the plant. This thick planting, and the large number of leaves left on the stalk, insures small leaves of thin texture. The tobacco is primed—that is, the leaves are gathered as they ripen. The harvesting is thus prolonged, and frequently lasts from June 15 to September 15, none of the leaves being taken off until they show signs of being ripe.

The Sumatra tobacco when planted early in the season is without spots, and makes what is known as the plain wrapper. When planted late it spots freely.

The Cuban tobacco is a smaller plant. The leaves are smaller and only about 12 or 15 are left on a plant. On the peninsula, especially at Fort Meade, a great deal of the tobacco land is irrigated by overhead sprays. It is claimed that this materially hastens the maturity of the crop, so that it ripens in from forty-five to fifty-five days from the date of setting out. It is usual to grow two or three sucker crops from each planting, and two main crops are planted each year—spring and fall. The sucker crop is not fit for wrappers as a rule, as it is too strong. It makes a good, strong filler.

The Cuban tobacco is harvested by cutting the whole plant and spearing on laths or by priming or by cutting the stalk in sections of two leaves each. In priming, the leaves are put into baskets and carried to the barn in covered wagons. They are then strung on strings tied to laths a finger width apart, making from 40 to 50 leaves on each lath. The laths are hung up in well-ventilated barns and allowed to dry. When thoroughly cured and the leaves are in proper case, or order, they are stripped off and tied into hands. These hands are then bulked for the sweat, the Cuban and Sumatra tobaccos being kept separate.

The bulks may be built up directly on the floor, or the leaves may be put into bins. In large establishments the temperature and humidity of the room can be thoroughly regulated to secure uniform progress of

the fermentation. This is done by steam pipes to warm the room, in which there are vents for the escape of steam when it is desired to make the atmosphere more moist. The temperature of the room is kept quite high, and the vapor from the bulk which is being worked over is very pungent and almost overpowering. There is a very strong odor of ammonia, which makes it difficult to breathe.

The bulk is watched very closely, and as the temperature rises it is torn down, each hand of tobacco is taken up and shaken thoroughly to dry it a little, to cool it slightly, and to open the leaves so that they will not stick together. Before the sweat is completed the bulk is pulled down and built up eight or ten times, according to the condition of the tobacco. It is impossible, even for an expert curer, to give explicit directions as to when the bulk should be turned, as it depends entirely upon the condition of the tobacco and the temperature it attains, and these must be determined by the operator.

The temperature must rise gradually, and if it is found to be rising too rapidly, the bulk is torn down and a fresh one built up. Sometimes the bulk is not up over twenty-four hours before it is torn down again and built up afresh. If the tobacco is in high case, that is, quite moist, the bulks have to be turned over frequently in order to prevent too rapid action and to shake out the leaves which would otherwise stick together. If a bulk, as seldom happens, should dry out, it is turned over and mixed with a bulk which is in high case. The tobacco should never be sprinkled in this stage of the process to bring it into case.

The temperature of the pile is allowed to rise gradually until it occasionally reaches 180° F. The fermentation is then at its highest. From this point the temperature subsides until the fermentation is complete and the bulk attains the normal temperature of the room. This maximum temperature must not be reached too quickly, and it must be managed differently with the different tobaccos. The fermentation must be carefully controlled, and not allowed to go too far with the wrapper leaf. With the filler, the further it goes and the more intense the action, the stronger and finer will the tobacco be for its purpose, if the work is judiciously done. As a matter of fact, it is not unusual to resweat the filler leaf to bring out the strong, rich properties which it is desired to develop. As the fermentation does not extend to the bottom of the pile, it is customary to put 8 or 10 inches of trash, which has already been sweated, on the bottom; and where bins are used a layer of trash is also put around the sides.

After the sweat the tobacco is brought into proper case and is then very carefully sorted. The wrapper leaf is sorted into four grades of light wrappers and four grades of dark wrappers, according to the length of the leaves. These are placed in small boxes on either side of the operator, and when a box is full the leaves are taken out and the Cuban tobacco is put up into "carottes" (cylindrical rolls). The carottes are made up into bales, similar in every way to the Cuban package, the wrappings being imported from Cuba for the purpose. The

Sumatra wrappers are put up into bales similar in every way to the well-known form that is imported into this country in large quantities from Holland.

The filler leaves are frequently resweated and are usually petuned, a process which makes them very much heavier, darker, and stronger. The petuning is either done by spraying, which is the best way, or by dipping the tobacco. The essential part of the petuning liquid is a thick infusion of tobacco stems of the finest quality obtainable. To this is added molasses, cider, Jamaica rum, or sour wine. Frequently other matters are put into the petuning liquid, according to the taste or fancy of the operator, to add quality to the leaf. This is a secret of the Cuban method and the only part of the process which they are unwilling to divulge.

When the petuning is done by dipping the tobacco, each hand is dipped separately, and is then thoroughly shaken, after which it must be bulked down to draw—that is, until the moisture has become thoroughly absorbed and evenly distributed through the leaves. Otherwise they would be apt to spot and change color. The wrappers are never treated in this way, as it is not desirable that they should have the properties of a good filler.

After the bales have been made up they are put into a warehouse in piles, not over 3 or 4 bales high, and should be kept at a moderately uniform and rather cool temperature at least two years, in order that the tobacco shall age, before it is suitable for making up into cigars. There seems to be no particular change that goes on, at least no noticeable outward change, as in the case of fermentation, but the tobacco loses the harshness that is always noticeable in fresh tobacco, and becomes mellow, as wines and liquors do by standing. When properly put up it will keep almost indefinitely in the bale, and the longer it is left to age the better it becomes.

There is no doubt that tobacco can be handled much better as well as more economically in large than in small quantities. The fermentation is much more uniform in large bulks than in small. If there are several bulks they can, if necessary, be mixed to insure the proper conditions. The different kinds of tobacco need to be treated differently, and this is only possible in case of a large quantity, where the selections will amount to enough to handle. With a large quantity of tobacco, also, it is possible to grade more carefully and more closely; and, lastly, it is always essential to have a large supply of tobacco of uniform quality in order that manufacturers may maintain any particular line of goods they may desire. For these reasons the farmers usually sell their crops from the field or from the barn to the larger producers or companies who maintain curing houses. It is claimed that not more than 2 per cent of the tobacco in the Gadsden district of western Florida remains in the hands of the farmers later than October 1. In southern Florida, also, it has been found more economical and more successful for the farmers to combine and have one large curing house, or to sell their

product to the curing house rather than attempt to do the curing, grading, and sorting themselves.

CURING WHITE BURLEY TOBACCO.

White Burley tobacco is grown almost exclusively on the lower silurian limestone forming the blue grass region of Kentucky and Ohio. The plants are set out between May 15 and June 25, in rows about 3½ feet apart and 18 to 24 inches in the row. The season of growth averages about ninety days. The plants are topped to eighteen or twenty-two leaves and the lower leaves are pruned or picked off. When ripe the stalks are cut and split lengthwise and laid on the ground to wilt. They are then strung on sticks, four or six on a stick, and the sticks are hung on a low scaffold in the field. Within a week they are hauled into a well-ventilated barn, hung in tiers, and cured without the use of artificial heat. The process of curing must be gradual to produce a good and uniform color. This is regulated by the ventilator doors, according to the temperature and the humidity of the air. The crop can usually be cured in six weeks. The leaves are stripped from the stalk during the winter, graded as trash and lugs and bright, medium, and dark leaf. These are tied into hands and bulked down for a short time, after which they are "prized" into hogsheads. "Prizing" is pressing by power into the hogshead. The crop goes through a certain amount of fermentation in the bulk, and it must be examined occasionally to see that the temperature does not run too high. When it does, as seldom happens if the tobacco is in good condition when it is put down, the bulk is turned over and a new one built up.

The manufacturers always rehandle and resweat Burley tobacco before using, and very little attention is therefore given to this process by the grower.

The White Burley tobacco when properly cured has a cherry-red or red-brown leaf of a mild flavor and great absorbing properties. The absorbing property makes it of especial value for the manufacture of sweet chewing plug. The lighter varieties, possessing little oil and gum, are used for smoking tobacco. On account of the absorbing properties and the importance of this in the manufacture of chewing tobacco, the tobacco must be prized rather dry in order to suit the market demand. By far the largest proportion of the White Burley tobacco is used in the domestic trade.

CURING BRIGHT YELLOW TOBACCO.

The tobacco grown in Maryland and on the heavier soils of Virginia and North Carolina is used both for manufacturing purposes and for the regie trade. Tobacco has been a staple article of produce in Virginia and Maryland since the very earliest colonial times, and it forms a very interesting part of the history of the development of the two States. Large quantities were formerly sent to France, Holland, and

Belgium, and it was highly thought of for pipe smoking in our domestic trade, it being a bright, mild, and sweet-flavored tobacco. In recent years, however, the White Burley has been coming into great favor for the same purpose that the Maryland and Virginia tobaccos were formerly used for. The very much larger yield of the White Burley has lowered the price of the Maryland and Virginia tobaccos almost below the point of profitable production.

The process of curing these tobaccos is essentially the same as that just described for the White Burley. There are, however, certain districts, especially in Virginia, where certain modified methods have been used to such an extent as to give character to the tobacco. But these are local methods, and are not as prominently recognized now as they were a few years ago.

The bright yellow tobacco of southern Virginia, North and South Carolina, and East Tennessee, is grown upon a certain type of very sandy soil. The planting is usually done from the 10th of May to the 10th of June. The plant is topped to from eight to twelve leaves, depending upon the vigor of the plant and the character of the season. The more vigorous the plant and the wetter the season, the more leaves can be left on to mature. The plant is regularly suckered every week if need be. There are various methods of harvesting the crop. Sometimes the entire stalk is cut, as with other tobaccos, usually only those which appear to be ripe being taken and the others being left to mature further. At other times the leaves are picked off as they mature and the rest of the plant is allowed to ripen further.

The second method has a decided advantage from the fact that the leaves of a plant do not all ripen at the same time. There is less waste and the leaves are gathered at about the same stage of maturity. The plant should be thoroughly ripe when cut in order to give the finest texture and the brightest color. If the whole plant is cut, it is speared onto a stick, or, if the leaves only are stripped as they ripen, they are strung on a string or wire and attached to a lath. The leaves are sorted to a certain extent in the field, keeping those of a uniform color and ripeness together as much as possible. When cut, the tobacco is carried at once to the barn without exposure to the sun and without allowing it to wilt or to lie upon the ground.

The tobacco barns are tight, with flues running across a short distance from the ground and returning to the chimney, which is built next to the furnace. In early days barns were built of logs, with the cracks completely stopped with mud or clay so as to make them perfectly tight. The barns are usually small, averaging from 16 to 22 feet square and of about the same height to the plate. Frequently as many as 18 or 20 of these barns are built together on a plantation, but never closer than about 100 feet apart, on account of the great danger from fire. There are quite a number of different barns and of different flues and of arrangements for distributing the heat, many of them patented and all of them described with more or less minuteness in tobacco literature.

The tobacco is hung in the barn in as fresh a state as possible, and the firing immediately begins, so that the heat will ascend into the tobacco while the leaves are stiff and the heat can be equally distributed throughout the space. Three days are needed to cure a barn, and it takes from 2 to 3 cords of dry wood. It requires very careful judgment and careful observation to cure this bright tobacco properly. The least inattention or wrong move is liable to reduce a barn of the finest yellow tobacco to a very inferior grade. No definite rules can be given, but the information must be acquired through experience, preferably under the direction of some person who has acquired skill in the method.

When the fires are started, a thermometer is hung on a level with the bottom leaves and is carefully watched day and night, while at the same time the plants themselves are carefully and frequently inspected. The heat must be increased very gradually, but it must never on any account be checked. It must never be so intense as to cause sweating. The first process in the curing is to maintain a temperature of 80° or 90° until the leaf is yellowed properly. This requires from eighteen to thirty-six hours, and must be very carefully managed. After the yellowing the heat is raised 5° or 10° at a time, and held at each stage for one or two hours, until it has attained a temperature of 115° or 120°, where it is held for several hours until the leaf is thoroughly cured. After this the stalk has to be cured by raising the temperature to 160° or 175°, by stages of 5° or 10° per hour, and keeping the temperature at this point until the stalk is thoroughly cured.

After the drying the barn is opened and the fires go out, and after thirty-six hours the leaf is usually in order for removal. It should not be exposed to very damp weather, as this is supposed to injure the color; but if the air outside is too dry, a little wet straw may be thrown over the flues in order to slightly moisten the atmosphere of the barn. The tobacco is then taken down and bulked on the sticks in piles. It is left in this way for several days to straighten out the leaves and improve the appearance. It is then rehung, being crowded very close to prevent injury as far as possible from atmospheric changes, or it may be bulked down permanently to keep it in order for stripping.

The leaves are stripped from the stem and tied into hands after being sorted into six or eight grades of wrappers, fillers, and smokers. The tobacco is then bulked down and left for one or two months, when the color becomes fixed and the slight greenish tinge which was left on removal from the barn is removed. The color is then no longer subject to change. Much of the tobacco is carried loose to the warehouse and sold in the open market. Some of it is packed in small hogsheads and shipped.

It is very necessary to grade the tobacco properly according to the character of the leaf and its color.

CURING EXPORT TOBACCO.

The class of tobacco known as dark export or shipping tobacco has a strong, heavy leaf, used largely in the export trade. It is exported in great quantities to England and the other continental markets of Europe, as well as to Africa and other foreign countries. In Europe the tobacco is used for cigars, chewing, and smoking, but its chief demand is as wrapper leaf. In our market it is graded according to color, fatness, texture, and length of leaf, each foreign country buying essentially a particular grade.

In the dark (export) tobacco districts when the leaves are ripe the stalk is cut and laid on the ground to wilt. It is then put on sticks, six or eight to the stick, and hauled to the barn. The tobacco is either hung immediately in the barn or is hung on scaffolds outside for a few days in order to yellow. There is a difference of opinion as to whether this yellowing process goes on better on the scaffolds or in the barn. In either case it acquires in a few days a rich, deep-yellow color. When the leaves show an even yellow color, slow fires are built on the floor of the barn, very small at first and gradually increasing in size until the barn becomes as hot as it is safe to make it. This firing process requires usually four or five days. It is important that the wood should be thoroughly seasoned in order not to produce smoke. Smoke makes the tobacco bitter and leaves an odor of creosote on the leaf. This heating cures the leaf, but leaves the stem still green. After the fires are withdrawn the sap runs down from the stalk into the leaf and in the event of damp weather a second or third firing is frequently given by the best growers. Flue curing has not been practiced with any general success so far in the dark-tobacco region.

After the tobacco is properly cured, the leaves are stripped from the stalk, graded as to length and quality, tied into hands, and bulked down in piles 4 or 5 feet high and covered with canvas or loose boards. Fermentation undoubtedly occurs while in the bulk, but to what extent and exactly what changes are produced are not known. Little attention is paid to the matter except to see that the temperature of the bulk does not at any time rise too high. The tobacco is either sold loose or prized into hogsheads, as with the White Burley and manufacturing tobaccos.

TYPES OF EXPORT TOBACCO.

The dark tobaccos are classed into four general types, which are further graded according to color, the darkest first, viz: 1, German type; 2, Italian type; 3, Austrian type; 4, French type.

1. The German type is a very fat, heavy-bodied leaf, strong, tough, and elastic, 18 to 26 inches long, with fine stems and fiber. Generally the heaviest, darkest types go to Germany, the color varying according to the demand, but a fat leaf is always required. Length is not a prime requisite, but is an advantage.

German Saucer is a piebald leaf, sweet, strong, and elastic, with other characteristics of the general German type. It is used in the manufacture of plug, and is called "Saucer" on account of its treatment with certain liquors or sauces before manufacture.

German Spinner is rich and heavy (heaviest of all the dark tobaccos), of clear, fine texture, very elastic, of darkest color, and is used in spinning twist tobacco.

2. The Italian type is a little lighter in color than the German types, very smooth and silky, not so fat, but of good length. They are sorted into three grades: A, B, and C. A is a leaf 25 to 26 inches long, of delicate fiber, solid red-brown color, elastic and strong, and is used as a cigar wrapper; B, 22 to 25 inches long, is used for cigars and snuff, rich and of good body; C, 18 to 20 inches long, is used for cigars, moderate weight of body, yet in other respects corresponding to the type A.

3. The Austrian type is slightly lighter in color than the Italian, but the two types grade into each other so that no sharp line can be drawn. They are very smooth, fine in fiber, very solid, firm, glossy, red-brown, tough, elastic, and of good length.

Under the Austrian wrapper may be classed the Swiss wrappers, by many called the finest type of dark tobacco. Swiss wrappers are from 26 to 30 inches long, broad, silky, of fine fiber and stem, chestnut-brown in color, wide between fibers. They are used in Switzerland as cigar wrappers. The amount of wrapper shipped to Switzerland is small, but it brings the highest prices.

4. The French type of tobacco is lighter in color, a brownish-red to red; thinner of body, not so fat; has little elasticity, and is in most ways a poorer grade of leaf than the three types just described. A clear leaf, supple and even, is insisted upon. France also takes some heavier tobaccos, according to demands. The grades are: A, 23 to 25 inches long, moderately smooth, good color, dark or light according to uses; B, 18 to 22 inches long; C, good lugs.

The Spanish regie trade takes a large quantity of nondescript and low-grade leaf and lugs of all types, colors, and textures. Very little good leaf is called for.

The English type conforms in nearly every respect to the German demands, one type filling both markets. The English Government imposes a tax on all imported tobacco; hence, weight is reduced in every way possible before tobacco is shipped to England. Much of it is stemmed, the midrib is cut out, the leaves are tied into hands and hung up in open, well-ventilated warehouses. The leaf is bulked in as dry order as possible, with only enough moisture so that the leaf will not break when handled.

The heaviest type of tobacco goes to England for use in navy plug. Sailors require stimulants, and the heaviest of tobaccos carrying a high percentage of nicotine are used in navy plug.

CURING PERIQUE TOBACCO.

The variety of tobacco known as Perique, and valued and famed throughout the markets of the world for its fine flavor and aroma, is all raised within the Mississippi bottom lands, mainly in St. James and Assumption parishes, La. Fifty thousand pounds is probably the largest crop ever raised of this tobacco, and, considering the ready market and high price it brings and the ease with which it can be raised, it seems strange that its cultivation and curing has not extended. At present the culture and peculiar methods of curing are only practiced by the Arcadians living close by the Mississippi and upon the Grand Pointe Vacherie. A vacherie is an island raised 4 or 5 feet above the swamps bordering the river. Dr. Stubbs, director of the Louisiana Experiment Station, gives the following description of the peculiar method of curing this tobacco:

The soil of the vacherie is a calcareous loam of a chocolate color, of great fertility, and easily worked. This soil is preferred to the sandy river soil.

True Perique is a fine fiber, medium leaf, and small stems; is strong, rich, gummy, tough, and dark, and when taken from the press has a beautiful, glossy appearance. On account of its strength it is mixed with milder kinds, both for smoking tobacco and cigarettes. By Louisianians it is also chewed. There is a material variation in the quality of leaf grown. On a sandy soil it has a delightful aroma, highly prized, which declines with the increase of clay in the soil. The crop is graded into wrappers, fillers, and smokers. At one time every leaf was brushed and cleaned before being subjected to curing. This is not now generally done.

The tobacco will show a yellowish, mottled appearance, with leaves crisp and easily broken, about the 1st of July, when it is ready to cut. Contrary to the general practice elsewhere the plants are cut during the hottest part of the day, three inches from the ground, leaving two or three leaves on the stump which are regarded as worthless, having served their purpose of protecting the rest of the plant from sand and dirt. Sharp-pointed pieces of swamp cane are stuck in the end of each stalk, making a hook, by which each plant is suspended upon a rope stretched lengthwise in the shed, the plants 6 inches apart on the rope, the ropes 1 foot apart. As the plants wilt and the leaves become brown they are removed from the stalk, and the midrib, still green, is taken out. The first leaves are pulled from the stalk in about ten days, and one to three leaves, at intervals of a few days thereafter, until the stalk is stripped.

The leaves, after the removal of the midrib, are twisted into rolls of 20 to 30 leaves each. These rolls or twists are packed into boxes 11 inches square, holding about 50 pounds, and when the boxes are nearly full are subjected to a continuous pressure of about 7,000 pounds per square foot by means of weights on a lever 12 to 15 feet long. The pressure must be continuous, therefore screw pressures can not be used. After being under pressure for twenty-four hours, the tobacco is taken out, opened, and aired a few minutes until the exuded juices, black, tarry, and thick, can be reabsorbed, when it is again subjected to pressure. This treatment continues daily for ten days, every twist being opened, aired, and turned so that the juices will saturate the entire mass. From a light brown the tobacco grows darker each day until it shines in oily blackness. After ten days the manipulation becomes less frequent, say once in three or four days.

In three months the tobacco is cured and emits a rich, spirituous flavor which has been imparted to it by the reabsorption of the oxidized juices. It will thus be seen that Perique tobacco is cured and preserved by the resinous gums contained in the natural leaf. The wrappers are handled with great care and kept separate during the process of curing.

The tobacco is next put into cylindrical rolls, or "carottes," containing 4 pounds usually. The leaves are opened, straightened, and aired. Upon a cloth 24 by 15 inches the best wrapper leaves are placed, bottom side down, and the fibers so arranged as to point to a longitudinal median line. Leaves to the depth of half an inch are placed on these, and over them a second cloth, and this mass tramped. The ends of the mats are then doubled over about 3 inches and the whole tramped again. The entire mass is then rolled into a cylinder and the corners of the leaves tucked down into the hollow center. The ends of the cloth are tied and a rope wound tightly around the coil from end to end by a windlass made for the purpose. At the expiration of twenty-four hours the rope is taken off and rewound very tightly. After this the carotte is ready for the market. An ordinary man, with a boy, can put up ten carottes a day.

MARKETING TOBACCO.

For the production of a salable article much depends upon the character of the soil, and a great deal depends upon the skill in curing. Fully as much, however, depends upon the proper grading and sorting of the tobacco, and the style of package in which it is sent to the manufacturer. Too much can not be said about the necessity for very careful attention to these apparently small details. It is very important, moreover, that the planters should study the markets, the demands from foreign countries, the requirements of our own manufacturers, and aim to produce exactly what they want, and to get it to them in the way in which they can best use it rather than to study the matter of economy.

A great deal can be accomplished by improving the seed, by importing new seed and by improving the methods of cultivation, but more can be accomplished by a steady and persistent effort to produce, through methods of cultivation and fermentation, sorting, grading, etc., the closest possible resemblance to the type which is desired by the manufacturer and the consumer. This is the business side of the transaction. A careful study of and compliance with the requirements of the market undoubtedly will insure a better price quite as much as any difference in the smoking and chewing qualities of the leaf. The excellence of tobacco in these qualities has improved much more than the practice of grading and sorting in compliance with the market demands. There is yet plenty of room for improvement in the quality of tobacco, but just at present the chief need is for additional attention to these commercial details.

FARMERS' BULLETINS.

These bulletins are sent free of charge to any address upon application to the Secretary of Agriculture, Washington, D. C. Only the following are available:

No. 15. Some Destructive Potato Diseases: What They Are and How to Prevent Them. Pp. 8.
No. 16. Leguminous Plants for Green Manuring and for Feeding. Pp. 24.
No. 18. Forage Plants for the South. Pp. 30.
No. 19. Important Insecticides: Directions for Their Preparation and Use. Pp. 20.
No. 21. Barnyard Manure. Pp. 32.
No. 22. Feeding Farm Animals. Pp. 32.
No. 23. Foods: Nutritive Value and Cost. Pp. 32.
No. 24. Hog Cholera and Swine Plague. Pp. 16.
No. 25. Peanuts: Culture and Uses. Pp. 24.
No. 26. Sweet Potatoes: Culture and Uses. Pp. 30.
No. 27. Flax for Seed and Fiber. Pp. 16.
No. 28. Weeds; and How to Kill Them. Pp. 30.
No. 29. Souring of Milk, and Other Changes in Milk Products. Pp. 23.
No. 30. Grape Diseases on the Pacific Coast. Pp. 16.
No. 31. Alfalfa, or Lucern. Pp. 23.
No. 32. Silos and Silage. Pp. 31.
No. 33. Peach Growing for Market. Pp. 24.
No. 34. Meats: Composition and Cooking. Pp. 29.
No. 35. Potato Culture. Pp. 23.
No. 36. Cotton Seed and Its Products. Pp. 16.
No. 37. Kafir Corn: Characteristics, Culture, and Uses. Pp. 12.
No. 38. Spraying for Fruit Diseases. Pp. 12.
No. 39. Onion Culture. Pp. 31.
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No. 56. Experiment Station Work—I. Pp. 30.
No. 57. Butter Making on the Farm. Pp. 15.
No. 58. The Soy Bean as a Forage Crop. Pp. 24.
No. 59. Bee Keeping. Pp. 32.
No. 60. Methods of Curing Tobacco. Pp. 16.
No. 61. Asparagus Culture. Pp. 40.
No. 62. Marketing Farm Produce. Pp. 28.
No. 63. Care of Milk on the Farm. Pp. 40.
No. 64. Ducks and Geese. Pp. 48.
No. 65. Experiment Station Work—II. Pp. 32.
No. 66. Meadows and Pastures. Pp 24.
No. 67. Forestry for Farmers. Pp. 48.
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No. 77. The Liming of Soils. Pp. 19.
No. 78. Experiment Station Work—V. Pp. 32.
No. 79. Experiment Station Work—VI. Pp. 28.
No. 80. The Peach Twig-borer—an Important Enemy of Stone Fruits. Pp. 16.
No. 81. Corn Culture in the South. Pp. 24.
No. 82. The Culture of Tobacco. Pp. 23.